CLAIMS

1. A method for microfluidic analysis of a fluid sample, comprising:

loading a microfluidic card with a fluid sample;

lysing the fluid sample to separate components of the fluid sample;

capturing the separated components on a solid substrate;

washing the separated components with wash buffers;

amplifying the washed components in an the amplification chamber; and

pumping the amplified components over a lateral flow strip for detection.

2. The method of claim 1 wherein the separated components are bacteria.

3. The method of claim 1 wherein the washing includes removing nucleic acid to prohibit interference with the amplifying the washed components.

4. The method of claim 2 wherein the bacteria are *Escherichia. coli., Staphylococcus aureus, Pseudomonas aeruginosa, Salmonella spp., Staphylococcus epidermidis, Klebsiella pneumoniae, Enterobacter cloacae, β-Streptococcus, Serratia marcescens, and/or Bacillus cereus.*

5. The method of claim 1 further including priming the separated components with DNA primers.

6. The method of claim 1 wherein the pumping includes visually detecting the presence of bacterial DNA on the lateral flow strip.

7. The method of claim 1 further including engaging the microfluidic card with a manifold of an instrument for purposes of pumping the fluid sample through the card.

8. A method of microfluidic analysis of a fluid sample on a microfluidic card, comprising:

collecting a fluid sample;

filtering the fluid sample through a membrane module wherein target cellular material is retained on membrane;

passing a wash buffer across the membrane such that target cellular material remains on the membrane;

passing induction solution across membrane;

passing a lysing solution across the membrane;

passing a wash buffer across the membrane to wash the lysing solution from the membrane;

passing a first NASBA solution across the membrane;

passing a wash buffer across the membrane to wash the first NASBA solution from the membrane;

passing a second NASBA solution across the membrane;

passing a wash buffer across the membrane to wash the second NASBA solution from the membrane;

passing a detection solution across the membrane;

amplifying a RNA signal by thermo-cycling the cellular material;

washing the detection probe solution from the membrane; and

exposing the washed detection probe solution to a lateral flow strip for visual detection of RNA.

9. The method of claim 8 wherein the membrane module is removed from a filtration apparatus and inserted into the microfluidic card.

10. The method of claim 8 wherein the induction solution is pipetted onto the card.

11. The method of claim 8 wherein the second NASBA solution includes enzymes.

12. The method of claim 8 wherein the microfluidic card in fluidly engaged with the manifold of a fluidic instrument for pumping the fluid throughout the card.

13. The method of claim 9 wherein the microfluidic card is removed from the fluid engagement of the manifold and detachably connected to a thermo-coupler for the amplification of the RNA signal.

14. A system for microfluidic analysis of assays, comprising:

a diagnostic disposable microfluidic card having interconnected flow channels, valves, reservoirs, inlet ports, a filter membrane and a thermo-coupler, and a lateral flow detection strip contained within the microfluidic card wherein the lateral flow detection strip may be used to detect the presence of DNA or RNA bacteria; and

an instrument, the instrument having a manifold for fluidly coupling with the microfluidic card, the instrument controlling the fluid flow on the disposable card.

15. A microfluidic system for typing antiglobulin assays, comprising:

a substrate having a first surface and a second surface, flow channels contained between the first and second surface, the flow channels having an upstream end and a downstream end;

an inlet port for receiving a first fluid sample, the inlet port extending through the first surface and fluidly connected to an inlet flow channel;

a filter positioned downstream from the inlet flow channel, a first and second flow channel fluidly connected with and downstream of the filter, wherein the filter separates the first fluid into a fluid without particles and a fluid containing particles, the fluid without particles enters the first flow channel and the fluid containing particles enters the second flow channel,

a mixing chamber fluidly interconnected to the first flow channel, the mixing chamber having a port for receiving a second fluid;

a heater thermally coupled to the mixing chamber, wherein the heater heats the mixing chamber;

a separation device fluidically connected to the mixing chamber;

an indicator flow channel fluidly connected to the separation device wherein the indicator channel includes an inlet port for receiving a third fluid sample, and wherein the indicator channel further includes a transparent window downstream of the inlet port for visual interpretation of the assay results.

16. The microfluidic system for typing antiglobulin of claim 15 wherein the first fluid is blood.

17. The microfluidic system for typing antiglobulin of claim 15 wherein the fluid without particles is plasma.

18. The microfluidic system for typing antiglobulin of claim 15 wherein the second fluid is a mixture including reagents, red cells, diluted red cells denoted as SI and SII.

19. The microfluidic system for typing antiglobulin of claim 15 wherein the third mixture is an antiglobulin serum.

20. The microfluidic system for typing antiglobulin of claim 15 wherein the heater is an electric resister.

21. The microfluidic system for typing antiglobulin of claim 15 wherein the filter is a diffusion-based.

22. The microfluidic system for typing antiglobulin of claim 15 wherein the filter is a tangential flow filter.

23. The microfluidic system for typing antiglobulin of claim 15 wherein the filter is a sedimentation filter.

24. A method of microfluidically typing blood, comprising:

microfluidically separating red cells and plasma by diffusion-based separation;

removing blood protein from the red cells;

diluting the red cells in saline;

dividing the diluted red cells into three portions, reacting the first portion with Anti-A, reacting the second portion with Anti-B, and reacting the third portion with Anti-D;

dividing the plasma into two portions, reacting the first portion of the plasma with A_1 and reacting the second portion of plasma with B red blood cells; and

visually interpreting the reactions.